

**U.S. STEEL GARY WORKS  
RESPONSE TO NEIC/EPA REQUEST FOR INFORMATION**

**FACT SHEET**

**Reference Figure No.:** GL-1 and GL-2

**Process Identification:** No. 1 Electro-Galvanize Line

**Process Description:** Steel coils received from the 2-Stand and 80-Inch Temper Mills and 80-Inch Recoil Line are uncoiled and processed through a caustic cleaner tank and brush scrubber to remove grease, coating oil and dirt. The steel strip is processed through a rinse tank to remove the caustic cleaner solution from the surface of the strip in preparation for the pickling operation. Surface oxides are removed from the strip as it passes through the acid cleaning tank. After acid cleaning, the strip is rinsed in a rinse tank to remove the acid solution prior to entering the electro-plating solution tanks. In the first electro-plating tank, electrical current flows through a zinc solution from the zinc cast anodes to the conductor roll, bonding zinc to one side of the strip. The strip is then rinsed prior to entering the second electro-plating tank. A similar process occurs in the second electro-plating tank as the first, except that the zinc is bonded to the other side of the strip. After electro-plating, the strip is rinsed, dried and coiled prior to storage for direct sales.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Electro-Galvanize Building

**Process Start Up Date:** Single side coating line - April 1977  
Double side coating line - July 1992

**Process Throughput Rates:**

**Capacity:** 0.32 million tons/year  
**1993 Throughput Rate:** 0.25 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shear	Scrap Steel	17,800 tons/year
Anode Caster	Zinc Dross	300 tons/year

## GL-1 and GL-2 Concluded

### ***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Acid Filtration System	Used Filters and Filter Bags	Non-hazardous (Based on Chemical Analysis)	Not Available
Plating Solution Filtration System	Spent Diatomaceous Earth	Non-hazardous (Based on Chemical Analysis)	Not Available

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**FACT SHEET**

**Reference Figure No.:** GL-3 and GL-4

**Process Identification:** No. 6 Galvanizing Line

**Process Description:** Steel coils received from the 2-Stand and 80-Inch Temper Mills and 5-Stand Cold Reduction Mill are uncoiled and processed through a caustic cleaner tank and brush scrubber to remove grease, coating oil and dirt. The steel strip is then processed through a rinse tank to remove the caustic cleaner solution from the surface of the strip in preparation for the annealing and galvanizing processes. The strip is softened in the annealing furnace where the steel is heated and cooled in an inert (HNx gas) atmosphere to prevent formation of surface oxides and make the surface reactive with molten zinc in the zinc pot. The strip is then run through the zinc pot to coat both sides of the strip. In the zinc pot, the strip is directed around sink rolls and stabilizer rolls and out of the molten zinc bath. After coating, the strip may be processed through the galvanneal furnace (for special applications) prior to quenching or directly into the quench tank. The strip is then processed through a chemical treatment tank to enhance rust resistiveness and adhesion of organic coatings. An additional coating may be applied to the strip in the phosphate coating process that consists of a phosphate additive tank, phosphate coating tank and rinse tanks. Phosphate coating is only used for products that will require better adhesion of paint onto the surface of the zinc coated strip. The phosphate additive solution is basically a grain refiner that prepares the strip for the application of the phosphate coating in the phosphate coating tank. Residual chemical treatment and/or phosphate coating is removed from the strip at the rinse tanks. The strip is then coiled prior to storage for direct sales or further processing at Batch Anneal or 2-Stand Temper Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Galvanizing at South Sheet Mill

**Process Start Up Date:** 1962

**Process Throughput Rates:**

<b>Capacity:</b>	0.42 million tons/year
<b>1993 Throughput Rate:</b>	0.32 million tons

**Water Discharges To Outfalls:** None

GL-3 and GL-4 Concluded

***Revert/Recycled Materials:***

<u><b>Source</b></u>	<u><b>Type of Material</b></u>	<u><b>Generation Rate</b></u>
Shears	Scrap Steel	9,900 tons/year

***Waste Streams:***

<u><b>Source</b></u>	<u><b>Type of Waste</b></u>	<u><b>Characterization</b></u>	<u><b>Generation Rate</b></u>
Annealing Furnace	Refractory Materials	Non-hazardous (Based on Process Knowledge)	Not Available
Galvanneal Furnace	Refractory Materials	Non-hazardous (Based on Process Knowledge)	Not Available

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**FACT SHEET**

**Reference Figure No.:** GL-5 and GL-6

**Process Identification:** No. 8 Galvanizing Line

**Process Description:** Steel coils received from the 5-Stand and 6-Stand Cold Reduction, and 2-Stand Temper Mills are uncoiled and processed through a caustic cleaner tank and brush scrubber to remove grease, coating oil and dirt. The steel strip is then processed through a rinse tank to remove the caustic cleaner solution from the surface of the strip in preparation for the annealing and galvanizing processes. The strip is softened in the annealing furnace where the steel is heated and cooled in an inert (HNx gas) atmosphere to prevent formation of surface oxides and make the surface reactive with molten zinc in the zinc pot. The strip is then run through the zinc pot to coat both sides of the strip. In the zinc pot, the strip is directed around sink rolls and out of the molten zinc bath. The strip is processed through a quench tank to reduce the temperature of the strip prior to further processing in the chemical treatment tank. A coating is applied to the strip in the chemical treatment tank to enhance rust resistiveness and adhesion of organic coatings. The strip is then coiled prior to storage for direct sales or further processing at Batch Anneal or 2-Stand Temper Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Galvanizing at South Sheet Mill

**Process Start Up Date:** 1950

**Process Throughput Rates:**

**Capacity:** 0.10 million tons/year  
**1993 Throughput Rate:** 0.07 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shears	Scrap Steel	3,600 tons/year

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Annealing Furnace	Refractory Materials	Non-hazardous (Based on Process Knowledge)	Not Available

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**FACT SHEET**

**Reference Figure No.** PM-1 and PM-2

**Process Identification:** 160/210" Plate Mill

**Process Description:** The Plate Mill produces steel plates for direct sales. Steel slabs received from Slab Preparation are heated to rolling temperatures in the reheat furnaces to enable reduction from steel slab to steel plate thickness. Steel slabs are processed through scale breakers and high pressure water sprays to remove the scale formed on the surface of the slab. Water and scale are discharged to a flume and scale pit for separation. The plates are then processed through a reversing mill to convert the original slab size to the finished plate thickness. The rolled plates from the reversing mill are processed through levelers to flatten the rolled plates and then through shears to cut the plates to designated length and width prior to shipment. Steel plates from the levelers are also processed through special application furnaces and/or through the four shears prior to sales. Sheared plates for special applications are processed through the continuous heat treat furnaces prior to sale.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** 160"/210" Plate Mill

**Process Start Up Date:** 1961

**Process Throughput Rates:**

**Capacity:** 1.0 million tons/year  
**1993 Throughput Rate:** 0.8 million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Reheat Furnaces	Non-contact Cooling	25 MGD
Scale Pit	Process	10 MGD

PM-1 and PM-2 Concluded

***Revert/Recycled Materials:***

<u><b>Source</b></u>	<u><b>Type of Waste</b></u>	<u><b>Generation Rate</b></u>
Dry Scale Pit	Mill Scale	Not Available
Scale Pit	Mill Scale	Not Available
Scale Pit	Used Oil	Not Available
Shears	Scrap Steel	Not Available

***Waste Streams:***

<u><b>Source</b></u>	<u><b>Type of Material</b></u>	<u><b>Characterization</b></u>	<u><b>Generation Rate</b></u>
Furnaces	Refractory Materials	Non-hazardous (Based on Process Knowledge)	Not Available
Flume	Clean-Out Debris	Non-Hazardous (Based on Process Knowledge)	Not Available

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**EXAMPLE FACT SHEET**

Reference Figure No.      PM-2

Process Identification:    160/210" Plate Mill

**Process Description:**      The Plate Mill produces Steel plates for direct sales. Steel Slabs received from Slab Preparation are heated to red hot in the reheat furnaces to enable steel reduction from steel slab to steel plate thickness. Steel slabs are processed through scale breakers and high pressure water sprays to remove the scale formed on the surface of the slab. Water and scale are discharged to a flume and scale pit for separation. The plates are then processed through a reversing mill to convert the original slab size to the finished plate thickness. The rolled plates from the reversing mill are processed through levelers to flatten the rolled plates and then through shears to cut the plates to designated length and width prior to shipment. Steel plates from the levelers are also processed through special application furnaces and/or through the four shears prior to sales. Sheared plates are periodically processed through the continuous heat treat furnaces prior to sale.

**Process Location** (Referenced to plant map building in which process is located or directions from nearest buildings):    160"/210" Plate Mill

**Process Start Up Date:**    1961

**Process Throughput Rates:**

Capacity	1.0 Million Tons Annually
1993 Throughput Rate	0.8 Million Tons

**Water Discharges:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Not Applicable		

Waste Streams:

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Continuous Heat Treat Furnaces	Refractory Materials	Non-hazardous	Undetermined
Car Bottom Heat Treat Furnace	Refractory Materials	Non-hazardous	Undetermined
Car Bottom Normalizing Furnace	Refractory Materials	Non-hazardous	Undetermined
Slow Cool Furnaces	Refractory Materials	Non-hazardous	Undetermined

Revert/Recycled Materials:

<u>Source</u>	<u>Type</u>	<u>Characterization</u>	<u>Generation Rate</u>
Shears (4)	Scrap Steel	Non-hazardous	(1)
West Shear	Scrap Steel	Non-hazardous	(1)

- (1) Approximately 0.1 million total tons of scrap was generated at the Plate Mill during 1993.

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**EXAMPLE FACT SHEET**

Reference Figure No.      PM-1

Process Identification:    160/210" Plate Mill

Process Description:      The Plate Mill produces Steel plates for direct sales. Steel Slabs received from Slab Preparation are heated to red hot in the reheat furnaces to enable steel reduction from steel slab to steel plate thickness. Steel slabs are processed through scale breakers and high pressure water sprays to remove the scale formed on the surface of the slab. Water and scale are discharged to a flume and scale pit for separation. The plates are then processed through a reversing mill to convert the original slab size to the finished plate thickness. The rolled plates from the reversing mill are processed through levelers to flatten the rolled plates and then through shears to cut the plates to designated length and width prior to shipment. Steel plates from the levelers are also processed through special application furnaces and/or through the four shears prior to sales. Sheared plates are periodically processed through the continuous heat treat furnaces prior to sale.

Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):    160"/210" Plate Mill

Process Start Up Date:    1961

Process Throughput Rates:

Capacity	1.0 Million Tons Annually
1993 Throughput Rate	0.8 Million Tons

Water Discharges:

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Reheat Furnaces	Non-Contact Cooling Water	25 MGD
Scale Pit	Process Water	10 MGD

Waste Streams:

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Reheat Furnaces	Refractory Materials	Non-hazardous	Undetermined
Flume	Clean-Out Debris	No analyses	Undetermined

Revert/Recycled Materials:

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Dry Scale Pit	Mill Scale	Non-hazardous	Undetermined
Scale Pit	Mill Scale	Non-hazardous	Undetermined
Scale Pit	Used Oil	Non-hazardous	Undetermined
Terminal Lagoons	Dredged Material	No analyses	Undetermined

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**FACT SHEET**

**Reference Figure No.:** GDS-1

**Process Identification:** Blast Furnace Gas Distribution and  
Coke Oven Gas Distribution Systems

**Process Description:**

Blast Furnace Gas (BFG) is a by-product of the blast furnace ironmaking process. BFG generated at Gary Works is cleaned at the gas cleaning systems at the individual blast furnaces and distributed via gas lines to certain plant combustion units. The combustion units that are fired with BFG are: the blast furnace stoves used to provide hot blast air to the blast furnaces, No. 4 Boiler House (for steam generation), and the Turbo Blower Boiler House (for steam generation).

As BFG travels through the distribution system, water vapor in the gas condenses. The condensate is removed from the BFG gas lines by means of running water seals that enable the condensate to drain from the transmission line, and be carried with the running water while maintaining a seal between the gas line and the atmosphere. At Gary Works, the water for the running seals is piped to the seals from the blast furnace recycle system. After passing through the running seals, the water is returned to the blast furnace recycle system. Attachment 1 provides a listing of the identification numbers and general locations of the BFG distribution system running seals.

Coke Oven Gas (COG) is a by-product of the cokemaking process. Raw COG from the coke oven batteries is processed at the Coal Chemical Plant by removal of by-products (ammonia, tar and light oils). COG generated at Gary Works is distributed via gas lines to certain combustion units. The combustion units that are fired on COG are: the Coal Handling Thaw Shed; the Coke Plant Boiler House; the 84-Inch Hot Strip Mill Reheat Furnaces and Waste Heat Boilers; the 160/210-Inch Plate Mill; the No. 1 BOP Shop; and the Turbo Blower Boiler House.

As COG travels through the distribution system, water vapor and small amounts of condensible organic compounds condense. The condensate is removed from the COG gas lines by means of condensate drip legs. The drip legs allow the condensate to accumulate at various locations throughout the COG system. The condensate is subsequently discharged to a COG condensate collection container at each drip leg location.

## GDS-1 Concluded

The collected condensate is periodically removed from the containers using vacuum trucks and discharged in the distillation sump at the coal chemical plant for recycling. Attachment 2 provides a listing of the COG condensate drip legs at Gary Works.

***Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):*** The BFG gas distribution system is located between the blast furnaces and the consuming units. The system is concentrated in the area of the plant immediately west of the slip.

The COG gas distribution system is located between the coke ovens and the consuming units. The westernmost terminus is at the 84-Inch Hot Strip Mill, and the easternmost terminus is at the coal handling thaw shed.

### ***Process Start Up Date:***

BFG Distribution System	1917
COG Distribution System	1954

### ***Process Throughput Rates:***

#### **BFG Distribution System**

<b><i>Capacity:</i></b>	Not Readily Available
<b><i>1993 Throughput Rate:</i></b>	522,000 SCFM

#### **COG Distribution System**

<b><i>Capacity:</i></b>	93 Million SCF/day
<b><i>1993 Throughput Rate:</i></b>	357,000 SCF/day

***Water Discharges To Outfalls:*** There are no direct discharges to plant outfalls from the BFG gas distribution system. The water used in the running gas seals is obtained from and returned to the blast furnace recycle system.

There are no discharges of water from the COG gas distribution system to plant outfalls. Condensate is recycled at the coal chemical plant.

### ***Revert/Recycled Materials:***

<b><u>Source</u></b>	<b><u>Type of Water</u></b>	<b><u>Nominal Discharge Rate</u></b>
COG Condensate Drip Legs	COG Condensate	Variable

***Waste Streams:*** None

**FACT SHEET GDS-1**

**ATTACHMENT 1**

**USS STEEL GROUP - GARY WORKS**

Locations of Blast Furnace Gas Distribution System Running Seals	
Number of Running Seals	General Location
9	No. 4 Boiler House
1	No. 4 Flare Stack
2	East of Fab Shop C
1	No. 2 Flare Stack
10	Turbo Blower Boiler House
4	Gas Booster Station
1	No. 1 Flare Stack

# FACT SHEET GDS-1

## ATTACHMENT 2

### USS STEEL GROUP - GARY WORKS

Locations of Coke Oven Gas Condensate Drip Legs	
Identification Number	Location
0	West of Car Thawing Shed
1	East of Pulverizer Building
2	South of Coal Handling Building
3	South of Middle of Coal Storage Yard
4	West of Coal Storage Yard
301	Behind Gas Cleaner office
302	West of BOP Shop Gas Cleaner
303	West of 302
304	Northwest of 303
312	Northwest of 304
401	East of E J & E office
402	North of E J & E office
403	Northeast of E J & E office
404	Old Rail Mill Pit Building under high line
405	Old Rail Mill Pit Building under high line
406	North of 405
420	Northeast end of 46 Soaking Pit
422	West of 46 Pit side
422 ½	North of 422
423	Southwest corner of 46 Pit side
423 ½	North of 423
424 "A,B"	150' North of 423
425	Corner of 46 Pit & Rolling Mill

**FACT SHEET GDS-1**

**ATTACHMENT 2 (Concluded)**

**USS GROUP - GARY WORKS**

Locations of Coke Oven Gas Condensate Drip Legs	
Identification Number	Location
701	Southwest corner of Fab C
702	Between TBBH & Fab C doorway
GW2	West of C.P. Fire Station
GW4	West of Recycle Basin
GW5	Opposite GW4
GW6	Southwest corner of Virginia Tunnel
GW7	Southwest corner of No. 1 BOP Shop Washhouse
GW8 West	Northeast of Stabilization Plant
GW8	Under high line
SM1 & SM2	Front of Chem Lab.
SM5A	Northeast side of slip
SM6	North of Sub Station #6
SM7	Northwest end 210 Plate Mill in field
1	North side of 84-Inch Hot Strip Mill West End
2	300 feet north of Old 80-Inch West End
3	100 feet from 2
4	West side of 66-Inch Pickle Line

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**FACT SHEET**

**Reference Figure No.:** CP-1 and CP-2

**Process Identification:** Coal Handling

**Process Description:** Coal required for coke production is received by railroad car. During winter months, it is sometimes necessary to thaw the coal in the railcar before the cars can be emptied in the car dumper. Frozen lumps of coal are broken up in the rotary drum breaker. Coal is sent from the car dumper to a six cell storage bin. The coal is then pulverized and sent to the fine coal building where the various grades of coal are blended in preparation for charging into the ovens. The blended coal for Batteries No. 5 and No. 7 receives no further processing before being transferred. The blended coal for Batteries No. 2 and No. 3 is transferred to precarbon units where the coal is heated and dried before charging in the ovens.

**Process Locations (Referenced to plant map building in which process is located or directions from nearest buildings):** Coal Handling at Coke Plant

**Process Start Up Date:** September 1959

**Process Throughput Rates:**

<b>Capacity:</b>	5.4 million tons of coal/year
<b>1993 Throughput Rate:</b>	2.8 million tons of coal

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Dust Collectors	Coal Dust	1 ton/day

**Waste Streams:** None

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**Reference Figure No.:** CP-3

**Process Identification:** Coke Ovens Nos. 2 and 3 Batteries

**Process Description:** Blended, heated and dried coal from the precarbon units is charged into the ovens at Batteries No. 2 and No. 3. The ovens are underfired with coke oven gas for approximately fourteen hours, driving off the volatile material and remaining moisture, producing metallurgical coke for the blast furnaces. Coke is removed from the ovens by pushing a ram into one side of the oven and catching the coke and pushing emissions on the other side in a combination quench car/scrubber which carries the coke to a quench tower where the coke is quenched. The quenched coke is placed on a wharf, screened in the screening station and sent to the blast furnaces. Coke too small for use in the blast furnaces is sold to off-site processors.

Coke oven gas generated in the coking process is collected and sent to the coal chemical plant for by-products recovery and reuse, as well as used for underfiring the batteries, and for fuel in other areas at Gary Works.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Nos. 2 and 3 Batteries at the Coke Plant

**Process Start Up Date:** No. 2 Battery - 1976  
No. 3 Battery - 1977

**Process Throughput Rates:**

<b>Capacity:</b>	1.75 million tons of coke/year
<b>1993 Throughput Rate</b>	1.67 million tons of coke

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Nos. 2 and 3 Batteries	Raw Coke Oven Gas	22 M cf/year

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** CP-4

**Process Identification:** Coke Ovens Nos. 5 and 7 Batteries

**Process Description:** Blended coal from coal preparation is charged directly into the ovens of Batteries Nos. 5 and No. 7. The ovens are underfired with coke oven gas for approximately nineteen hours, driving volatile material and moisture from the coal, producing metallurgical coke for the blast furnaces. Coke is removed from the ovens by pushing a ram into one side of the oven and catching the coke on the other side in a quench car. Pushing emissions are captured in a duct system and conveyed to a baghouse for particulate removal. The quench car carries the hot coke to a quench tower where the coke is quenched. The quenched coke is placed on a wharf, screened in a screening station and sent to the blast furnaces. Coke too small for the blast furnaces is sold to off-site processors.

Coke oven gas generated by the coking process is collected and used for underfiring the batteries, and for fuel in other areas at Gary Works.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Nos. 5 and 7 Batteries at the Coke Plant

**Process Start Up Date:** 1954

**Process Throughput Rates:**

**Capacity:** 0.63 million tons of coke/year  
**1993 Throughput Rate:** 0.58 million tons of coke

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Nos. 5 and 7 Batteries	Raw Coke Oven Gas	8.8 M cf/yr

**Waste Streams:**

<u>Source</u>	<u>Type of Material</u>	<u>Characterization</u>	<u>Generation Rate</u>
Baghouse	Pushing Emission Dust	Non-hazardous (Based on Chemical Analysis)	600 tons/yr

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**Reference Figure No.:** CP-5, CP-6, CP-7, CP-8 and CP-9

**Process Identification:** Nos. 2, 3, 5 and 7 Flushing Liquor Systems

**Process Description:** The volatile material and moisture driven from coal during the coking process are piped to gas collection headers that run above the ovens for the length of the battery. Flushing liquor is sprayed into these collection headers and provides the primary cooling and cleaning of the off-gas.

The flushing liquor system is a recirculating system that requires the volume of liquor in the system to be controlled, and removal of tar and particulates. Condensed vapors in the off-gas from the batteries increases the quantity of liquor. Excess liquor is piped to storage tanks and utilized for coke quenching. Tar and particulates are removed through a series of tar decanters and strainers, piped to storage tanks for further processing and stored for direct sales.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Coke Plant-Coal Chemical Plant adjacent to Batteries Nos. 2, 3, 5 and 7

**Process Start Up Date:** No. 2 and 3 Batteries - 1976 and 1977  
No. 5 and 7 Batteries - 1954

**Process Throughput Rates:**

**Capacity:** 93 M cf coke oven gas/day  
**1993 Throughput Rate:** 33,000 M cf coke oven gas

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Tar Storage Tanks	Tar	21.7 M gal/yr*
Predecanters and Decanters	Tar Sludge	1.2 M kg/yr

**Waste Streams:** None

\* Generation rate for all tar storage tanks at Coke Plant.

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**Reference Figure No.:** CP-10

**Process Identification:** Process Water System

**Process Description:** Excess process water generated in the coking process from volatile material and moisture in the coal is utilized in the coke quenching operation. Excess process water is accumulated in storage tanks and piped to the quench tower sumps where it is combined with plant service water to provide the required volume of quench water. Revert/recycled liquid materials from various areas throughout the Coke Plant are processed through the distillation sump prior to transfer to the storage tanks.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Nos. 2, 3, 5 and 7 Batteries at the Coke Plant

**Process Start Up Date:** Nos. 2 and 3 Batteries - 1976 and 1977  
Nos. 5 and 7 Batteries - 1954

**Process Throughput Rates:**

**Capacity:** 2 million gallons/day  
**1993 Throughput Rate:** 151 million gallons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Distillation Sump	Oil	52,000 gallons/year

**Waste Streams:** None

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**Reference Figure No.:** CP-11

**Process Identification:** Coke Plant - Tar Dehydration

**Process Description:** The coking process in Batteries No. 2 and No. 3 produces tar with a high water content. In order to reduce this water content, the tar is heated and piped to a flash drum in which steam and light oil vapors are released. The dry tar is pumped to a storage tank for off-site sales or use at the Blast Furnaces. The steam and light oil vapors are piped to heat exchangers for recycle in the Tar Dehydration System.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings)** South of the Distillation Area at the Coke Plant

**Process Start Up Date:** Last Modification - 1985

**Process Throughput Rates:**

<b>Capacity:</b>	Wet = 2.60 million gallons/month Dry = 0.95 million gallons/month
<b>1993 Throughput Rate</b>	13 million gallons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nomimal Discharge Rate</u>
Heat Exchanger E-426	Non-contact Cooling	10 MGD

**Revert/Recycled Materials:** None

**Waste Streams:** None

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**Reference Figure No.:** CP-12 and CP-13

**Process Identification:** Coke Oven Gas Cleaning Process

**Process Description:** Coke oven gas enters the collector mains on the batteries and is exhausted to coke oven gas processing unit operations for cleaning, byproduct recovery and cooling prior to reuse. The primary coolers cool the coke oven gas and remove water vapor, tar and naphthalene. Exhausters move the gas. The gas passes through ammonia scrubbers, which spray a solution containing sulfuric acid through the gas for removal of ammonia. The gas is then passed through direct water sprays in the final coolers to further reduce water vapor and maximize light oil removal in the benzol scrubbers.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Coke Plant - Primary Pump House, Booster Station, Pump House, Sulfate Centrifuge Building, Distillation

**Process Start Up Date:** 1954

**Process Throughput Rates:**

**Capacity:** 93 M cf coke oven gas/day  
**1993 Throughput Rate:** 33,400 M cf coke oven gas

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nomimal Discharge Rate</u>
Heat Exchangers	Non-contact Cooling	20,000 gpm

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Primary Cooler Tar Tanks T-363A/T-363D	Tar	See Fact Sheet for Flushing Liquor Systems (CP-5 through CP-9)
Salt Centrifuge	Ammonium Sulfate	19,600 M tons/year

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** CP-14

**Process Identification:** Light Oil Recovery System

**Process Description:** Light oil removed from the coke oven gas in the benzol scrubbers is separated from the recirculating wash oil in the light oil recovery system. Rich wash oil from the benzol scrubbers is heated in a series of heat exchangers. The heated rich wash oil passes through a stripper in which steam is utilized to remove the light oil from the wash oil. Clean wash oil is cooled and recirculated to the benzol scrubbers. Vapor from the stripper, containing steam, light oil and some wash oil, is cooled to condense the vapor, and the components are separated in knockout drums and decanters. The light oil is sold offsite.

Recirculating wash oil can also pick up tar and unsaturated hydrocarbons from the coke oven gas passing through the benzol scrubbers. The sludge formed by these components is controlled by taking a side stream of wash oil from the strippers to the purifiers (called demuckers). Sludge removed in the demuckers is sent to AKJ Industries for recycle.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Distillation Area at the Coke Plant

**Process Start Up Date:** 1954

**Process Throughput Rates:**

**Capacity:** 24,500 gallons/day  
**1993 Throughput Rate:** 7.5 million gallons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nomimal Discharge Rate</u>
Light Oil Condensers	Non-contact Cooling	6 MGD
Bottom Coolers E-416	Non-contact Cooling	Not Available
Heat Exchangers E-426	Non-contact Cooling	6 MGD
Preheater E-453	Steam Condensate	Not Available

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Demuckers	Process Oil	4,000 gallons/month

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** CP-15

**Process Identification:** Benzene Vapor Recovery System

**Process Description:** Control of benzene emissions from the coal chemical area is accomplished by enclosing the possible emission points and blanketing the enclosed sources with natural gas. The points are interconnected in four pressure control systems; each system discharges the mixture of recovered vapor and natural gas into the 72 inch diameter coke oven gas suction main, which distributes coke oven gas to downstream combustion units.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Coal Chemical Plant adjacent to the Coke Oven Batteries

**Process Start Up Date:** 1991

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Decaners, Sumps and Tanks	Recovered Vapor	Not Available

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** BF-1

**Process Identification:** Blast Furnace No. 13


**Process Description:** Most raw materials for the production of iron are assembled in the stockhouse and transported by skip hoist to the top of the blast furnace. Pulverized coal and/or injection oil is injected directly into the furnace. The materials charged into the furnace and the hot blast air react to produce molten iron, slag and blast furnace gas. The molten iron is sent to the BOP shops for steel production. Slag is produced by the fluxing agents and contains impurities removed from the hot metal as well as unreacted fluxing agents. The slag is quenched and cooled prior to further processing at Koch Materials. The blast furnace gas produced in the furnace is cooled and cleaned for use as a by-products fuel in boilers and blast furnace stoves.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Blast Furnace No. 13

**Process Start Up Date:** March 1974 - first campaign  
June 1991 - current campaign

**Process Throughput Rates:**

<b>Capacity</b>	3.0 Million Tons/Year
<b>1993 Throughput Rate</b>	2.89 Million Tons



**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Blast Furnace	Non-Contact Cooling	30 MGD

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Stockhouse	Clean-up Material	1,000 tons (1993)
Stockhouse	Coke Breeze	12,500 tons
Stockhouse	Misc. Fines	100,000 cubic yards (Sinter Materials)
		25,000 cubic yards (pellets)

**BF-1 Concluded**

Material Transfer Points Baghouse	Dust	2,000 cubic yards (Stockhouse)
Quench Pits and Slag Granulator	Slag	0.8 Million tons
Casthouse	Beach Iron	43,000 tons
Gas Cooler	Blast Furnace Gas	165,000 SCFM
Dust Catcher	Flue Dust	85,000 tons
Sludge Filtration	Sludge	60,000 tons

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Blast Furnace, Blast Furnace Stoves and Casthouse	Refractory Material	Non-hazardous (Based on Chemical Analysis)	Variable

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**FACT SHEET**

**Reference Figure No.:** PKL-1

**Process Identification:** Cold Mills -- 84 Inch Pickle Line

**Process Description:** Pickling lines process coiled strip steel through a series of pickling tanks containing hydrochloric acid and rinse water to chemically remove oxide scale from the steel strip.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** The 84 Inch Pickle Line is located in the North Sheet Mill Area in the 84/66 Inch Continuous Pickle Line building adjacent to the 84 Inch Raw Coil Storage to the north and 66 Inch Raw Coil Storage to the south.

**Process Start Up Date:** 1968

**Process Throughput Rates:**

<b>Capacity:</b>	2.6 Million tons/year
<b>1993 Throughput Rate</b>	2.1 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
"N" Pump Station Emergency Overflow	Process	Emergency Discharge Only

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Pickling Tanks	Spent Pickle Liquor (used at Terminal Treatment Plant for wastewater treatment or processed at PVS ferric chloride plant)	59.5 Million gallons (1993)
Facility Shear/Slitter/Welder	Scrap Steel	140,480 tons (1993)

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** PKL-2

**Process Identification:** Cold Mills -- 80 Inch (South) & 66 Inch Pickle Lines

**Process Description:** Pickling lines process coiled strip steel through a series of pickling tanks containing hydrochloric acid and rinse water to chemically remove oxide scale from the steel strip.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** The 80 Inch (South) Pickle Line is located in the southwest side of the Sheet Products Division area in the South Continuous Pickling building adjacent to south Annealing. The 66 Inch Pickle Line is located in the North Sheet Mill Area in the 84/66 Inch Continuous Pickle Line building adjacent to the 84 Inch Raw Coil Storage and 66 Inch Raw Coil Storage.

**Process Start Up Date:** 66 Inch - 1959  
80 Inch - 1936

**Process Throughput Rates:**

**Capacity:** 66 Inch - 0.61 Million tons/yr.  
80 Inch - 0.74 Million tons/yr.

**1993 Throughput Rate:** 66 Inch - 0.45 Million tons  
80 Inch - 0.63 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
"N" Pump Station Emergency Overflow (66 Inch Line)	Process	Emergency Discharge Only
"S-1" Pump Station Emergency Overflow (80 Inch Line)	Process	Emergency Discharge Only

PKL-2 Concluded

***Revert/Recycled Materials:***

<u><b>Source</b></u>	<u><b>Type of Material</b></u>	<u><b>Generation Rate</b></u>
Pickling Tanks (both lines)	Spent Pickle Liquor (used at Terminal Treatment Plant for wastewater treatment or processed at PVS Ferric Chloride Plant)	66-Inch Pickle Line - 17.6 Million Gallons (1993) 80-Inch Pickle Line - 18.1 Million Gallons (1993)
66 Inch Pickle Line Shear/Slitter/Welder	Scrap Steel	33,130 tons (1993)
80 Inch Pickle Line Shear/Slitter/Welder	Scrap Steel	42,430 tons (1993)

***Waste Streams:***    None

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**FACT SHEET**

**Reference Figure No.:** BOP-1

**Process Identification:** No. 1 BOP

**Process Description:** No. 1 BOP produces molten steel for continuous casting and ingot teeming from hot metal (molten iron) produced in blast furnaces, steel scrap metal from on- and off-site sources, fluxing agents and alloys. The raw materials in the basic oxygen furnaces are reacted using a high velocity stream of high purity oxygen. Prior to charging hot metal into the basic oxygen furnaces, the hot metal is desulfurized and poured into a hot metal ladle. The hot metal, along with steel scrap and fluxing agents charged into the furnace, is exposed to the pure oxygen stream injected at a rate of 20,000 CFM until the desired steel chemistry and temperatures are obtained. Minor amounts of alloys may also be added as needed. Molten steel is tapped into a steel ladle in which final chemical additions can be made and transferred for further processing to No. 1 Continuous Caster, No. 2 Continuous Caster, or to ingot teeming. The fluxing agents area also used to remove impurities and form a slag, which is cooled and processed further on-site.

**Location Process (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 1 BOP Shop

**Process Start Up Date:** December 1965

**Process Throughput Rates:**

<b>Capacity:</b>	4.37 Million tons/year
<b>1993 Throughput Rate:</b>	3.4 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Exhaust Emission Hood Collection System	Non-Contact Cooling	3.5 MGD

BOP-1 Concluded

***Revert/Recycled Materials:***

<b><u>Source</u></b>	<b><u>Type of Material</u></b>	<b><u>Generation Rate</u></b>
Hot Metal Desulf., Transfer Ladles, Skimmer Station, and Basic Oxygen Furnaces	Steel, Slag, and Refractory	Not Available

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Baghouse	Dust	Non-hazardous (Bevill Wastes) also (Based on Chemical Analysis)	Not Available
Hot Metal Desulf. Baghouse	Dust	Non-Hazardous (Bevill Wastes) also (Based on Chemical Analysis)	3,000 cubic yards/yr

**U.S. STEEL GARY WORKS  
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**FACT SHEET**

**Reference Figure No.:** BOP-2

**Process Identification:** No. 1 Continuous Caster

**Process Description:** No. 1 Continuous Caster receives molten steel from No. 1 BOP and solidifies it into a continuously cast steel slab by using a mold, a series of rolls and water sprays. The steel slabs are transferred for further processing in the 84" Hot Strip Mill, 160/210" Plate Mill, or for outside sale. Molten steel is poured from the ladle into the tundish (which serves as a reservoir to permit changing supply ladles) and then to the mold and rolls of the continuous caster. As the solidified slabs continuously emerge from the caster, they are cooled and cut to the ordered length at the travelling slab torch cut-off station. The slabs are then stored for transfer to other locations for further processing.

**Location Process (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 1 BOP Shop Continuous Caster Building

**Process Start Up Date:** March 1967  
July 1982 (Major Rebuild)

**Process Throughput Rates:**

**Capacity:** 3.9 Million tons/year  
**1993 Throughput Rate:** 1.89 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Mold and Machine Water Heat Exchanger	Non-Contact Cooling	3.5 MGD
Scale Pit	Process	12 MGD

BOP-2 Concluded

***Revert/Recycled Materials:***

<b><u>Source</u></b>	<b><u>Type of Material</u></b>	<b><u>Generation Rate</u></b>
Scale Pit	Scale	Not Available
Scale Pit	Used Oil	Not Available
Slab Slitting	Steel Scrap	Not Available
Scale Collection Box	Scale	Not Available
Tundish and Mold	Clean-out Material	Not Available

***Waste Streams:***    None

**U.S. STEEL GARY WORKS  
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**FACT SHEET**

**Reference Figure No.:** BOP-3

**Process Identification:** No. 1 BOP Gas Cleaner

**Process Description:** The reaction between the pure oxygen and the molten iron and steel scrap in the basic oxygen furnaces generates particulate-containing gases that are cleaned before release to the atmosphere. These exhaust gases are contained within water-cooled furnace exhaust gas hoods located at each furnace. Following collection of the gas, it is water cooled and cleaned in a quencher and venturi scrubber used for gas cleaning. A grizzly, classifier and thickener remove solids from the recycled process water. The cleaned gas is further cooled in the gas cooling separator and discharged to the atmosphere through induced draft fans. Water for cooling the gas is recycled through the gas cooling water tower. Water for cooling the exhaust gas hoods is single-use non-contact water from the plant service water system.

**Location Process (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 1 BOP - Gas Cleaning Facilities

**Process Start Up Date:** December 1965

**Process Throughput Rates:**

<b>Capacity:</b>	255,000 ACFM
<b>1993 Throughput Rate:</b>	255,000 ACFM

**Water Discharges to Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Furnace Exhaust Gas Hoods	Non-Contact Cooling	3.5 MGD
Thickener	Process	Emergency Overflow Only

***BOP-3 Concluded  
Revert/Recycled Materials:***

<b><u>Source</u></b>	<b><u>Type of Material</u></b>	<b><u>Generation Rate</u></b>
Grizzly	Solids and Sludge	Not Available
Rake/Screw Classifier	Solids and Sludge	Not Available

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Sludge Dewatering	Sludge	Non-Hazardous (Bevill Wastes) also (Based on Chemical Analysis)	65,600 tons (1993)

**U.S. STEEL GARY WORKS  
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**FACT SHEET**

**Reference Figure No.:** Q-BOP-1

**Process Identification:** No. 2 Q-BOP

**Process Description:** No. 2 Q-BOP produces molten steel for casting and teeming by taking hot metal (molten iron) from the blast furnaces and exposing it in the basic oxygen process furnaces to a high velocity stream of high purity oxygen. In preparation for charging into the basic oxygen furnaces, the hot metal is poured into a hot metal mixer for storage and re-poured into an iron ladle. The hot metal is desulfurized in the ladle and processed through a skimmer station to remove impurities on the surface prior to charging into the furnace. The hot metal, along with the steel scrap and other additives, is exposed to the oxygen stream, which is injected from tuyeres located in the bottom of the furnace, until the desired steel chemistry and temperatures are obtained. Molten steel is tapped into steel ladles for downstream processing.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 2 Q-BOP

**Process Start Up Date:** February 1973

**Process Throughput Rates:**

<b>Capacity:</b>	4.37 Million tons/year
<b>1993 Throughput Rate:</b>	3.54 Million tons

**Water Discharges to Outfall:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Miscellaneous Cooling Water	Non-Contact Cooling	5.0 MGD

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Ladle Skimmer Station	Slag/Steel	Not Available
Various	Slag	Not Available

Q-BOP-1 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Mixer/Ladle/ Desulfurization Baghouse	Dust	Non-hazardous (Bevill Wastes) also (Based on Chemical Analysis)	Not Available
Flux Handling System Baghouses	Dust	Non-hazardous (Bevill Wastes) also (Based on Chemical Analysis)	Not Available

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**FACT SHEET**

**Reference Figure No.:** Q-BOP-2

**Process Identification:** No. 2 Continuous Caster

**Process Description:** No. 2 Continuous Caster receives molten steel from No. 1 BOP and No. 2 Q-BOP, and solidifies it continuously in a mold and series of rolls into steel slabs suitable for further processing in the 84" Hot Strip Mill, 160"/210" Plate Mill, or for outside sale. The ladles of molten steel, before the steel is fed into the caster, are skimmed to remove floating slag and placed in the ladle metallurgy facility to adjust steel chemistry and temperature. The steel is then poured from the ladle into a tundish (which serves as a reservoir to permit changing supply ladles). From the tundish the molten steel is fed into the mold section where the solidification of the slab strand starts. The partially solidified strand is drawn from the mold through water-cooled rollers and exposed to external water sprays to continue the solidification from the outside to the inside of the strand. As the solidified strands continuously emerges from the caster, slabs are cut to the ordered length at the travelling slab torch cut-off station and then stored for transfer to downstream processing units.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 2 Caster

**Process Start Up Date:** April 1986 (A & B Lines)  
July 1991 (C Line)

**Process Throughput Rates:**

**Capacity:** 5.26 Million tons/year  
**1993 Throughput Rate:** 4.70 Million tons

**Water Discharges to Outfalls:** None (All water processed through 2 Caster Water Treatment)

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Ladle Skimmers, Ladle Met Facility, and Caster Tundish/Mold	Slag	Not Available

Q-BOP-2 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Ladle Met Facility Baghouses	Dust	Non-Hazardous (Based on Chemical Analysis)	1,000 cubic yards (1993)
Caster Mold Baghouse	Dust	Non-Hazardous (Based on Chemical Analysis)	Not Available

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**FACT SHEET**

**Reference Figure No.:** Q-BOP-3

**Process Identification:** No. 2 Q-BOP Gas Cleaner

**Process Description:** The reactions in the basic oxygen process furnaces generate large volumes of gases containing particulates. The exhaust gases are captured in water cooled exhaust gas hoods located at each furnace. The exhaust gas is water cooled and cleaned in a quencher, scupper and venturi scrubber. A grizzly, rake classifier, thickeners and filters remove solids from the recycled process water. The cleaned gas is further cooled in the gas cooling separator and discharged to the atmosphere through induced draft fans. Non-contact water used to cool the exhaust gas hoods is cooled in the hood cooling water tower and recycled.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 2 Q-BOP - Gas Cleaning

**Process Start Up Date:** February 1973

**Process Throughput Rates:**

<b>Capacity:</b>	325,000 ACFM/system (two systems)
<b>1993 Throughput Rate:</b>	325,000 ACFM

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Thickeners	Treated Process	3.5 MGD
Fluid Drive Heat Exchanger	Non-Contact Cooling	5 MGD (Included in No. 2 Q-BOP Misc. Cooling Water)

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Terminal Lagoons	Dredged Solids	Variable
Grizzly & Rake	Solids and Sludge	76,500 tons

QBOP 3 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Sludge Filtration	Sludge	Non-Hazardous (Based on Chemical Analysis)	193,800 tons (1993)

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**FACT SHEET**

**Reference Figure No.:** Q-BOP-4

**Process Identification:** No. 2 Caster Water Treatment Mold Cooling, Internal Machine Cooling and Vacuum Degassing Water Systems

**Process Description:**

**Mold Cooling System:** Water cooled molds on the continuous casters require very clean, soft water to avoid scaling and maximize heat transfer. The mold cooling water system is a recirculating system that uses strained and softened plant service water for make-up. Chemicals are added to avoid scaling and corrosion. Mold water is cooled in a water-to-water heat exchanger.

**Ladle Metallurgy Facility and Caster Internal Machine Cooling System:** The internal cooling of the casting machine is accomplished with a recirculating non-contact water system. Chemicals are added to the water to avoid scaling and corrosion. The water is cooled in a cooling tower. Make-up is from the plant service water system. This system also services the non-contact cooling water requirements for the ladle metallurgy facility.

**Vacuum Degasser Water System:** Process water requirements of the vacuum degasser are met with a recirculating water system that includes a cooling tower and a clarifier to remove entrained particulates. Make-up is from the plant service water system.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 2 Caster

**Process Start Up Date:** 1986

**Process Throughput Rates:**

<b>Capacity:</b>	Mold Cooling Water - 5,730 GPM
	LMF and IMCW - 19,444 GPM
	Vacuum Degasser - 3,600 GPM
<b>1993 Throughput Rate:</b>	Same as Above

QBOP-4 Concluded

***Water Discharges To Outfalls:***

<b><u>Source</u></b>	<b><u>Type of Water</u></b>	<b><u>Nominal Discharge Rate</u></b>
Mold Cooling Water Circulation Sump	Process (Blowdown)	Variable
Mold Water Storage Tank	Process	Emergency Overflow Only

**Revert/Recycled Materials:** None

***Waste Streams:*** None (All process waters discharged to No. 2 Q-BOP Gas Cleaner Thickeners)

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**FACT SHEET**

**Reference Figure No.:** Q-BOP-5

**Process Identification:** No. 2 Caster Water Treatment Slab Spray Water System

**Process Description:** Process water for flume flushing at the casting machine, runout table and torch cut-off is recirculated through a scale pit, filters and cooling tower. Sludge in the filter backwash is separated in a thickener along with the blowdown from the vacuum degasser. Chemicals are added to prevent corrosion in the system and to aid in removal of solids in the thickener. Make-up is from the plant service water system.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** No. 2 Caster

**Process Start Up Date:** 1986

**Process Throughput Rates:**

**Capacity:** Spray Water - 9,475 GPM  
**1993 Throughput Rate:** 9,475 GPM

**Water Discharges to Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Cooling Tower	Process (Blowdown)	Variable

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Scale Pit	Scale	Not Available

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** OPS-1

**Process Identification:** Operations Services-Carpenter Shop and Construction Services

**Process Description:** The Carpenter Shop provides plant-wide services involving office and building demolition and construction, materials removal and installation, and painting. These services require the use of wood, glass, paint, and many other construction materials.

The Construction Services group provides plant-wide services for demolition and installation of construction or operating materials including brick, block, gunning and castable material, cement and other construction materials.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Carpenter Shop - Mason Shop

**Process Start Up Date:** 1901

**Process Throughput Rates:**

**Capacity:** Services Operation - Services/Jobs Provided as Needed  
**1993 Throughput Rate:** Services/Jobs Provided as Needed

**Water Discharges to Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shops and Work Sites	Non-Ferrous Material	Not Available
Shops and Work Sites	Steel Scrap	240 tons (1993)
Shops and Work Sites	Solvents	320 gallons
Shops and Work Sites	Used Oil	300 gallons

OPS-1 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Shops and Work Sites	General Debris	Non-hazardous (Based on Process Knowledge)	1,920 cubic yards (1993)
Baghouse (Carpenter Shop)	Wood Dust	Non-hazardous (Based on Process Knowledge)	420 cubic yards (1993)

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**FACT SHEET**

**Reference Figure No.:** OPS-2

**Process Identification:** Operations Services-Electrical Repair Shop and Crane Repair

**Process Description:** The Electric Repair Shop receives electric motors from facilities throughout Gary Works for repair. The repairs may include disassembly, cleaning, painting, component replacement and assembly, and involve the use of mechanical and electrical components, paint and lubricants.

Crane Repair provides plant-wide crane services that consist of inspection, maintenance and repairs. Materials used include mechanical and electrical components, paint, and lubricants.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Electrical Shop - Crane Maintenance

**Process Start Up Date:** Electric Shop - 1909  
Crane Maintenance - 1950

**Process Throughput Rates:**

**Capacity:** Services Operation - Services/Jobs Provided as Needed  
**1993 Throughput Rate:** Services/Jobs Provided as Needed

**Water Discharges to Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shops and Work Sites	Non-Ferrous Material	36 tons (1993)
Shops and Work Sites	Steel Scrap	400 tons
Shops and Work Sites	Solvents	1,800 gallons
Shops and Work Sites	Used Oil	780 gallons

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Shops and Work Sites	General Debris	Non-hazardous (Based on Process Knowledge)	1,080 cubic yards (1993)

**U.S. STEEL GARY WORKS  
RESPONSE TO NEIC/EPA REQUEST FOR INFORMATION**

**FACT SHEET**

**Reference Figure No.:** OPS-3

**Process Identification:** Operations Services-Structural/Fab and Pipe Services

**Process Description:** Structural/Fabrication Services provide for inspection, repair and installation of steel structures and facilities throughout Gary Works. Mobile equipment related to this function is also maintained and repaired. Materials used include steel stock, mechanical/electrical components, rubber, lubricants and fuels.

Pipe Services perform field and shop pipe fabrication, inspection, repair and installation for facilities plant-wide. Materials used include steel stock, pipe, plastic, fiberglass and lubricants.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Fabrication Shop "C" - Maintenance Shops

**Process Start Up Date:** 1950's

**Process Throughput Rates:**

**Capacity:** Services Operation - Services/Jobs Provided as Needed  
**1993 Throughput Rate:** Services/Jobs Provided as Needed

**Water Discharges to Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shops and Work Sites	Non-Ferrous Material	20 tons (1993)
Shops and Work Sites	Steel Scrap	1,910 tons
Shops and Work Sites	Solvents	1,920 gallons
Shops and Work Sites	Used Oil	300 gallons

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Shops and Work Sites	General Debris	Non-hazardous (Based on Process Knowledge)	1,560 cubic yards (1993)

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**FACT SHEET**

**Reference Figure No.:** OPS-4

**Process Identification:** Operations Services-Locomotive and Track Repair Services

**Process Description:** Locomotive Services provide operable railroad locomotive equipment for operations throughout the plant through its inspection, maintenance, repair and assembly of the equipment. Materials used include mechanical and electrical components, lubricants and fuels.

Track Repair Services repair and maintain railroad tracks throughout the Gary Works. Materials used include railroad track, switches, lubricants and fuel.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Locomotive Shop

**Process Start Up Date:** 1909

**Process Throughput Rates:**

**Capacity:** Services Operation - Services/Jobs Provided as Needed  
**1993 Throughput Rate:** Services/Jobs Provided as Needed

**Water Discharges to Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shops and Work Sites	Non-Ferrous Material	0.5 tons (1993)
Shops and Work Sites	Steel Scrap	35 tons
Shops and Work Sites	Solvents	300 gallons
Shops and Work Sites	Used Oil	4,000 gallons

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Shops and Work Sites	General Debris	Non-hazardous (Based on Process Knowledge)	60 cubic yards (1993)

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**FACT SHEET**

**Reference Figure No.:** OPS-5

**Process Identification:** Operations Services-Main Garage (East)/Truck Garage (West)

**Process Description:** The Main Garage (East) inspects, maintains and repairs automobiles, trucks and mobile equipment. They also provide for plant-wide transportation of some raw materials and waste materials. Materials used include steel stock, mechanical and electrical components, rubber, lubricants and fuels.

The Truck Garage (West) inspects, maintains and repairs vehicles and mobile equipment. They provide plant-wide transportation of some equipment and products. Materials used are similar to the Main Garage.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Garage - Maintenance Shops

**Process Start Up Date:** 1960

**Process Throughput Rates:**

**Capacity:** Services Operation - Services/Jobs Provided as Needed  
**1993 Throughput Rate:** Services/Jobs Provided as Needed

**Water Discharges to Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Main Garage and Truck Garage	Non-Ferrous Material	1.2 tons (1993)
Main Garage and Truck Garage	Steel Scrap	192 tons
Main Garage and Truck Garage	Solvents	4,800 gallons
Main Garage and Truck Garage	Used Oil	43,200 gallons

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Main Garage and Truck Garage	General Debris	Non-hazardous (Based on Process Knowledge)	1,650 cubic yards (1993)

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**FACT SHEET**

**Reference Figure No.:** OPS-6

**Process Identification:** Operations Services-Machine Shop and Tractor Services

**Process Description:** The Machine Shop services mechanical operating equipment which includes cleaning, inspection, repair, disassembly and assembly. Materials used include steel stock, mechanical and electrical components, rubber, lubricants and fuels.

Tractor Services provide operable mobile equipment for facilities throughout the plant by inspection, maintenance and repair of tractors, forklifts and mobile equipment. Materials used are similar to the Machine Shop described above.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Machine Shop - Crane Repair

**Process Start Up Date:** 1909

**Process Throughput Rates:**

**Capacity:** Services Operation - Services/Jobs Provided as Needed  
**1993 Throughput Rate:** Services/Jobs Provided as Needed

**Water Discharges to Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Machine Shop and Tractor Services	Non-Ferrous Material	72 tons (1993)
Machine Shop and Tractor Services	Steel Scrap	840 tons
Machine Shop and Tractor Services	Solvents	10,200 gallons
Machine Shop and Tractor Services	Used Oil	3,600 gallons

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Machine Shop and Tractor Services	General Debris	Non-hazardous (Based on Process Knowledge)	1,620 cubic yards (1993)

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**FACT SHEET**

**Reference Figure No.:** OPS-7

**Process Identification:** Operations Services-Wiremen/Motor Inspectors/HVAC

**Process Description:** Wiremen/Motor Inspector Services provide electrical repair and installation services for facilities throughout the plant. The services involve the inspection, repair and installation of electric motors, transformers, conduit, cable and associated components. Materials used include steel stock, mechanical and electrical components, rubber, plastic and lubricants.

Heating, Ventilation and Air Conditioning Services (HVAC) provide installation and repair of heating and refrigeration equipment for facilities throughout the plant. Materials used include mechanical and electrical components, air conditioning components, steel stock, rubber and refrigerants.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Wire Crew -- Refrigeration Shop

**Process Start Up Date:** 1910

**Process Throughput Rates:**

**Capacity:** Services Operation - Services/Jobs Provided as Needed

**1993 Throughput Rate:** Services/Jobs Provided as Needed

**Water Discharges to Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shops and Work Sites	Non-Ferrous Material	10 tons (1993)
Shops and Work Sites	Steel Scrap	84 tons
Shops and Work Sites	Solvents	Not Available
Shops and Work Sites	Used Oil	30 gallons

OPS-7 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Shops and Work Sites	General Debris	Non-hazardous (Based on Process Knowledge)	650 cubic yards (1993)
Shops and Work Sites	PCB transformers and/or capacitors	Hazardous	Not Available

**U.S. STEEL GARY WORKS  
RESPONSE TO NEIC/EPA REQUEST FOR INFORMATION**

**FACT SHEET**

**Reference Figure No.:** RS-1

**Process Identification:** Roll Shop - 160/210-Inch Plate Mill

**Process Description:** Rolls from Plate Mill operations must be maintained to established specifications of size, shape and surface in order to produce rolled steel that meets quality standards. Used rolls received from Plate Mill operations are processed through the roll shop for reconditioning/refinishing. In roll chucking, the chocks (bearing and housing) are removed prior to further processing through a grinder, lathe or sent off-site for reconditioning/refinishing. Grinding wheels on the grinder are used to restore the surface of the roll. Rolls may also be turned on one of two lathes to restore the surface of the roll. After processing the rolls through the grinder or lathes, the chocks are installed prior to use in Plate Mill operations.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Roll Shop at 160"/210" Plate Mill

**Process Start Up Date:** 1961

**Process Throughput Rates:**

**Capacity:** 300 rolls/year  
**1993 Throughput Rate:** 275 rolls

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Roll Chucking	Scrap Cast Iron Rolls	Not Available
Roll Chucking	Scrap Rolls	Not Available
Lathes	Scrap Chips	Not Available

RS-1 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Roll Grinder	Grinding Wheels	Non-hazardous (Based on Process Knowledge)	Not Available
Circulating Coolant System	Swarf	Hazardous (Based on Chemical Analysis)	Not Available

**U.S. STEEL GARY WORKS  
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**FACT SHEET**

**Reference Figure No.:** RS-2

**Process Identification:** Roll Shop - North Sheet Mill

**Process Description:** Rolls from the North Sheet Mill operations must be maintained to established specifications of size, shape and surface in order to produce rolled steel that meets quality standards. Used rolls received from North Sheet Mill operations are processed through the roll shop for reconditioning/refinishing. In roll chucking, the chocks (bearing and housing) are removed prior to further processing through grinders, shot blasting machine or sent off-site for reconditioning/refinishing. Grinding wheels on the grinder are used to restore the surface of the roll. Rolls may also be shot blasted to obtain the desired surface finish. After processing the rolls through the grinder, the chocks are installed prior to use in the mill stands at the North Sheet Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Roll Shop at North Sheet Mill

**Process Start Up Date:** December 1993

**Process Throughput Rates:**

**Capacity:** 37,900 rolls/year  
**1993 Throughput Rate:** 22,400 rolls

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Baghouse	Dust Fines	15 cubic yards/year 60 tons/year

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Roll Grinders	Grinding Wheels	Non-hazardous (Based On Process Knowledge)	Not Available
Collection Box	Swarf	Hazardous (Based on Chemical Analysis)	Not Available

**U.S. STEEL GARY WORKS  
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**FACT SHEET**

**Reference Figure No.:** RS-3

**Process Identification:** Roll Shop - South Sheet Mill

**Process Description:** Rolls from the South Sheet Mill operations must be maintained to established specifications of size, shape and surface in order to produce rolled steel that meets quality standards. Used rolls received from South Sheet Mill operations are processed through the roll shop for reconditioning/refinishing. In roll chucking, the chocks (bearing and housing) are removed prior to further processing through grinders, shot blasting machine or sent off-site for reconditioning/refinishing. Grinding wheels on the grinder are used to restore the surface of the roll. Rolls may also be shot blasted to obtain the desired surface finish. After processing the rolls through the grinder, the chocks are installed prior to use at the South Sheet Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Roll Shop at South Sheet Mill

**Process Start Up Date:** 1949

**Process Throughput Rates:**

**Capacity:** 31,600 rolls/year  
**1993 Throughput Rate:** 5,200 rolls

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Roll Shot Blasting	Spent Shot	6 cubic yards/year

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Roll Grinders	Grinding Wheels	Non-hazardous (Based on Process Knowledge)	Not Available
Collection Box	Swarf	Hazardous (Based on Chemical Analysis)	50 cubic yards/year
Collection Pit	Clean-up Debris	Hazardous (Based on Chemical Analysis)	Not Available

**U.S. STEEL GARY WORKS  
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**FACT SHEET**

**Reference Figure No.:** RS-4

**Process Identification:** Roll Shop - Tin Mill

**Process Description:** Rolls from the Tin Mill operations must be maintained to established specifications of size, shape and surface in order to produce rolled steel that meets quality standards. Used rolls received from Tin Mill operations are processed through the roll shop for reconditioning/refinishing. In roll chucking, the chocks (bearing and housing) are removed prior to further processing through grinders, shot blasting machine or sent off-site for reconditioning/refinishing. Grinding wheels on the grinder are used to restore the surface of the roll. Rolls may also be shot blasted to obtain the desired surface finish. After processing the rolls through the grinder, the chocks are installed prior to use in Tin Mill operations.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Roll Shop at Tin Division

**Process Start Up Date:** June 1933

**Process Throughput Rates:**

**Capacity:** 30,400 rolls/year  
**1993 Throughput Rate:** 15,600 rolls

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Roll Chucking	Scrap Rolls	Not Available
Baghouses	Dust	1.5 tons/month

RS-4 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Roll Grinders	Grinding Wheels	Non-hazardous (Based on Process Knowledge)	Not Available
Collection Box	Swarf	Hazardous (Based on Chemical Analysis)	Not Available
Collection Box	Rubber	Non-hazardous (Based on Process Knowledge)	Not Available
Flow-Con Unit	Swarf	Hazardous (Based on Chemical Analysis)	Not Available

**U.S. STEEL GARY WORKS  
RESPONSE TO NEIC/EPA REQUEST FOR INFORMATION**

**FACT SHEET**

**Reference Figure No.:** RS-5

**Process Identification:** Roll Shop - 6-Stand

**Process Description:** Rolls from the 6-Stand mill stands must be maintained to established specifications of size, shape and surface in order to produce rolled steel that meets quality standards. Used rolls received from 6-Stand operations are processed through the roll shop for reconditioning/refinishing. In roll chucking, the chocks (bearing and housing) are removed prior to further processing through grinders or sent off-site for reconditioning/refinishing. Grinding wheels on the grinder are used to restore the surface of the roll. After processing the rolls through the grinder, the chocks are installed prior to use in the mill stands at the 6-Stand.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Roll Shop, East of 6-Stand Tandem Mill at Tin Division

**Process Start Up Date:** June 1967

**Process Throughput Rates:**

**Capacity :** 20,000 rolls/year  
**1993 Throughput Rate:** 18,000 rolls

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Roll Chucking	Scrap Rolls	Not Available

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Roll Grinder	Grinding Wheels	Non-hazardous (Based on Process Knowledge)	Not Available
Flow-Con Unit	Swarf	Hazardous (Based on Chemical Analysis)	Not Available

**U.S. STEEL GARY WORKS  
RESPONSE TO NEIC/EPA REQUEST FOR INFORMATION**

**FACT SHEET**

**Reference Figure No.:** RS-6

**Process Identification:** Roll Shop - 84-Inch Hot Strip Mill

**Process Description:** Rolls from Hot Strip Mill operations must be maintained to established specifications of size, shape and surface in order to produce rolled steel that meets quality standards. Used rolls received from Hot Strip Mill operations are processed through the roll shop for reconditioning/refinishing. In roll chucking, the chocks (bearing and housing) are removed prior to further processing through a grinder, lathe or sent off-site for reconditioning/refinishing. Grinding wheels on the grinder are used to restore the surface of the roll. Rolls may also be turned on one of two lathes to restore the surface of the roll. After processing the rolls through the grinder or lathes, the chocks are installed prior to use in Hot Strip Mill operations.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Roll Shop at 84" Hot Strip Mill

**Process Start Up Date:** June 1967 (Upgraded in 1990)

**Process Throughput Rates:**

**Capacity:** 45,000 rolls/year  
**1993 Throughput Rate:** 43,000 rolls

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Roll Chucking	Scrap Grain Iron Rolls	Not Available
Roll Chucking	Scrap Rolls	Not Available
Lathes	Scrap Chips	Not Available

RS-6 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Roll Grinder	Grinding Wheels	Non-hazardous (Based on Process Knowledge)	Not Available
Collection Box	Swarf	Hazardous (Based on Chemical Analysis)	Not Available
Oil Waste Sump	Clean-up Debris	Non-hazardous (Based on Process Knowledge)	Not Available

**U.S. STEEL GARY WORKS  
RESPONSE TO NEIC/EPA REQUEST FOR INFORMATION**

**FACT SHEET**

**Reference Figure No.:** TM-1

**Process Identification:** Tin Mill 6-Stand Cold Reduction Mill

**Process Description:** Steel coils received from the Pickle Lines are uncoiled and processed through a series of six rolling stands to reduce the thickness of the steel strip, attain gage uniformity and improve surface quality and flatness prior to further processing at the designated Tin Mill facilities. As the thickness of the strip is gradually reduced, service water and rolling oil solution is sprayed onto the strip to provide lubrication and dissipate heat generated during the cold reduction process. The strip is coiled prior to further processing at the Cleaning Line or Continuous Anneal Line.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** 6-Stand Tandem Mill at Tin Division

**Process Start Up Date:** 1967

**Process Throughput Rates:**

**Capacity:** 0.84 million tons/year  
**1993 Throughput Rate:** 0.66 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Circulating Lubrication and Hydraulic Fluid System	Used Lubricants	Not Available

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** TM-2

**Process Identification:** Tin Mill No. 7 Cleaning Line

**Process Description:** The No. 7 Cleaning Line removes rolling oil solution remaining on the steel strip after cold reduction. Steel coils received from the 6-Stand Cold Reduction Mill are uncoiled and processed through two caustic cleaning solution tanks containing a sodium hydroxide solution. The caustic cleaning solution tanks also contain sets of horizontal grids, which are connected to power sources. Caustic cleaning solution combined with the use of an electrical current applied to the strip as it passes between the horizontal grids facilitate the removal of rolling oil solution from the strip. The strip is then processed through a brush scrubber and a hot rinse tank to remove residual cleaning solution remaining on the strip. The strip is coiled prior to further processing at Box Anneal.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Cleaning, South of 6-Stand Tandem Mill  
at Tin Division

**Process Start Up Date:** 1967

**Process Throughput Rates:**

**Capacity:** 0.34 million tons  
**1993 Throughput Rate:** 0.26 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shear and Uncoiler	Scrap Steel	Not Available

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** TM-3

**Process Identification:** Tin Mill Box Anneal

**Process Description:** In the box anneal process, steel coils are annealed in furnaces to make the steel soft and increase its ductility. Steel coils received from the 6-Stand Cold Reduction Mill are placed in the annealing furnace where the steel is heated and cooled in an inert (HNx gas) atmosphere to prevent formation of surface oxides prior to further processing at the Double Cold Reduction Mill and 48-Inch Temper Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Annealing, Southwest of 6-Stand Tandem Mill and West of Cleaning at Tin Division.

**Process Start Up Date:** 1968

**Process Throughput Rates:**

**Capacity:** 0.25 million tons

**1993 Throughput Rate:** 0.24 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:** None

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Annealing Furnaces	Ceramic Blankets and Sand	Non-hazardous (Based on Process Knowledge)	Not Available

**U.S. STEEL GARY WORKS  
RESPONSE TO NEIC/EPA REQUEST FOR INFORMATION**

**FACT SHEET**

**Reference Figure No.:** TM-4

**Process Identification:** Tin Mill Double Cold Reduction Mill

**Process Description:** Steel coils received from Box Annealing and Continuous Anneal Lines are uncoiled and processed through the two rolling stands in the Double Cold Reduction Mill to reduce the thickness of the steel strip and improve the surface finish and flatness of the strip. The strip is then coiled prior to further processing at the 45-Inch Side Trimmer and Tin Free Steel and Electrolytic Tinning Lines.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** D.C.R., North of Electrolytic Tinning Lines at Tin Division

**Process Start Up Date:** 1962

**Process Throughput Rates:**

**Capacity:** 0.29 million tons/year  
**1993 Throughput Rate:** 0.21 million tons

**Water Discharge To Outfalls:** None

**Revert/Recycled Materials:** None

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** TM-5

**Process Identification:** Tin Mill 45-Inch Side Trimmer and 48-Inch Temper Mill

**Process Description:** Steel coils received from designated Tin Mill facilities are uncoiled and processed through the side trimmer to remove the desired amount of steel from both edges of the strip, thereby establishing accurate and uniform width and producing parallel and reasonably smooth edges. The steel strip is then coiled prior to storage for direct sales or further processing at the Electrolytic Tinning Lines.

Steel coils received from Box Annealing and Continuous Anneal Lines are uncoiled and processed through the two rolling stands in the temper mill to reduce the thickness of the steel strip and improve the surface finish and flatness of the strip. The strip is then coiled prior to further processing at the Electrolytic Tinning and Tin Free Steel Lines.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Temper Rolling, North of Electrolytic Tinning Lines at Tin Division

**Process Start Up Date:** 1960 - 45-Inch Side Trimmer  
1958 - 48-inch Temper Mill

**Process Throughput Rates:**

45-Inch Side Trimmer	<b>Capacity:</b>	0.25 million tons/year
	<b>1993 Throughput Rate:</b>	0.09 million tons
48-Inch Temper Mill	<b>Capacity:</b>	0.68 million tons/year
	<b>1993 Throughput Rate:</b>	0.40 million tons

**Water Discharges To Outfalls :** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Materials</u>	<u>Generation Rate</u>
Shear and Side Trimmer	Scrap Steel	Not Available

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** TM-6 and TM-7

**Process Identification:** Tin Mill No. 1 Continuous Anneal Line

**Process Description:** Steel coils received from the 6-Stand Cold Reduction Mill and No. 7 Cleaning Line are uncoiled and processed through two electrolytic cleaning solution tanks containing a sodium hydroxide solution. The cleaning solution tanks also contain sets of horizontal grids, which are connected to power sources. Caustic cleaning solution combined with the use of an electrical current removes oil from the strip. The strip is then processed through a brush scrubber and a hot rinse tank to remove residual cleaning solution remaining on the strip. The strip is softened and its ductility is increased in the annealing furnace where the steel is heated and cooled in an inert (HNx gas) atmosphere to prevent formation of surface oxides prior to further processing at the Double Cold Reduction Mill and 48-Inch Temper Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Continuous Annealing, Southwest of 6-Stand Tandem Mill at Tin Division

**Process Start Up Date:** 1950

**Process Throughput Rates:**

**Capacity:** 0.15 million tons/year  
**1993 Throughput Rate:** 0.01 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shear	Scrap Steel	Not Available

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Annealing Furnace	Refractory Materials	Non-hazardous (Based on Chemical Analysis)	Not Available

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**FACT SHEET**

**Reference Figure No.:** TM-8 and TM-9

**Process Identification:** Tin Mill No. 2 Continuous Anneal Line

**Process Description:** Steel coils received from the 6-Stand Cold Reduction Mill and No. 7 Cleaning Line are uncoiled and processed through two electrolytic cleaning solution tanks containing sodium hydroxide. The cleaning solution tanks also contain sets of horizontal grids, which are connected to power sources. Caustic cleaning solution combined with an electrical current are applied to the steel strip as it passes between the horizontal grids to facilitate the removal of rolling oil solution from the strip. The strip is then processed through a brush scrubber and a hot rinse tank to remove residual cleaning solution remaining on the strip. The strip ductility is increased in the annealing furnace where the steel is heated and cooled in an inert (HNx gas) atmosphere to prevent formation of surface oxides prior to further processing at the Double Cold Reduction Mill and 48-Inch Temper Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Continuous Annealing, South of 6-Stand Tandem Mill at Tin Division

**Process Start Up Date:** 1959

**Process Throughput Rates:**

**Capacity :** 0.38 million tons/year  
**1993 Throughput Rate:** 0.37 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shear	Scrap Steel	Not Available

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Annealing Furnace	Refractory Materials	Non-hazardous (Based On Process Knowledge)	Not Available

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**FACT SHEET**

**Reference Figure No.:** TM-10 and TM-11

**Process Identification:** Tin Mill No. 1 Tin Free Steel Line

**Process Description:** The No. 1 Tin Free Steel Line produces chromium coated steel for direct sales. Steel coils received from designated Tin Mill facilities are uncoiled and processed through an electrolytic caustic cleaner solution tank to remove grease, oil and dirt. The steel strip is then processed through a rinse tank to remove the caustic cleaner solution from the strip in preparation for the sulfuric acid cleaning operation. Surface oxides are removed from the strip as it passes through a sulfuric acid cleaning tank. After acid cleaning, the strip is rinsed in a rinse tank to remove the acid solution prior to entering the chemical treatment tank. In the chemical treatment tank, chromium is deposited on both sides of the strip. Excess chrome plating solution is removed in the chrome rinse tank. The strip is dried and further processed through an electrostatic oiler where a coating oil is applied to reduce abrasion damage during processing through the side trimmer and coiler. The side trimmer removes the desired amount of steel from both edges of the strip, thereby establishing accurate and uniform width and producing parallel and reasonably smooth edges. The strip is then coiled prior to storage for direct sales.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Electrolytic Tinning at Tin Division

**Process Start Up Date:** 1950

**Process Throughput Rates:**

**Capacity:** 0.12 million tons/year  
**1993 Throughput Rate:** 0.10 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Scrap Reel and Side Trimmer	Scrap Steel	Not Available
Pickle Solution Holding Tank	Spent Acid Cleaning Solution	Not Available

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** TM-12

**Process Identification:** Tin Mill Tin Anode Caster

**Process Description:** The Tin Anode Caster produces tin anodes for the Electrolytic Tinning Lines. Tin ingots purchased from off-site sources, tin tails from anode casting and spent anodes from the electrolytic tinning lines are charged and melted in a natural gas fired tin pot. Liquid tin from the tin pot is poured into molds and cooled until the tin is solid. The cast anodes are then removed from the molds and further processed through a cut-off saw to remove tin tails from the cast anodes. Tin tails are returned to the tin pot for recycle and the cast anodes are sent to the electrolytic tinning lines melting pots.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** South of Electrolytic Tinning Lines and East of Tin Mill Office building at Tin Division.

**Process Start Up Date:** 1965

**Process Throughput Rates:**

<b>Capacity:</b>	2,800 tons/year
<b>1993 Throughput Rate:</b>	2,600 tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Tin Pot	Tin Dross	50 tons/year

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** TM-13 and TM-14

**Process Identification:** Tin Mill No. 5 Electrolytic Tinning Line

**Process Description:** The No. 5 Electrolytic Tinning Line produces tin coated steel for direct sales. Steel coils received from designated Tin Mill facilities are uncoiled and processed through a side trimmer to remove the desired amount of steel from both edges of the strip, thereby establishing accurate and uniform width and producing parallel and reasonably smooth edges. The steel strip is then processed through an electrolytic caustic cleaner solution tank to remove grease, oil and dirt and a rinse tank to remove the caustic cleaner solution from the strip in preparation for the sulfuric acid cleaning operation. Surface oxides are removed from the strip as it passes through a sulfuric acid cleaning tank. After acid cleaning, the strip is rinsed in a rinse tank to remove the acid solution prior to entering the electrolytic tin plating tank. In the electrolytic tin plating tank, tin is electrolytically plated on both sides of the strip. Excess tin plating solution is removed in the tin plating rinse tank. The strip is dried and processed through a melter quench to reduce the temperature of the strip prior to further processing in the chemical treatment tank. The chromium is applied to the strip in the chemical treatment tank to enhance rust resistiveness and adhesion of organic coatings. After the protective coating is applied, the strip is dried and processed through an electrostatic oiler where a coating oil is applied to reduce abrasion damage. The strip is then coiled prior to storage for direct sales.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Electrolytic Tinning at Tin Division

**Process Start Up Date:** 1957

**Process Throughput Rates:**

<b>Capacity:</b>	0.18 million tons/year
<b>1993 Throughput Rate:</b>	0.12 million tons

**Water Discharges To Outfalls:** None

TM-13 and TM-14 Concluded

***Revert/Recycled Materials:***

<b><u>Source</u></b>	<b><u>Type of Material</u></b>	<b><u>Generation Rate</u></b>
Shear and Scrap Baller	Scrap Steel	Not Available
Pickle Solution Holding Tank	Acid Cleaning Solution	Not Available
Electrolytic Tin Plating Tank	Tin Anodes	500 tons/year
Sludge Pit	Tin Dross	50 tons/year

***Waste Streams:***    None

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**FACT SHEET**

**Reference Figure No.:** TM-15 and TM-16

**Process Identification:** Tin Mill No. 6 Electrolytic Tinning Line

**Process Description:** The No. 6 Electrolytic Tinning Line produces tin coated steel for direct sales. Steel coils received from designated Tin Mill facilities are uncoiled and processed through a side trimmer to remove the desired amount of steel from both edges of the strip, thereby establishing accurate and uniform width and producing parallel and reasonably smooth edges. The steel strip is then processed through an electrolytic caustic cleaner solution tank to remove grease, oil and dirt and a rinse tank to remove the caustic cleaner solution from the strip in preparation for the sulfuric acid cleaning operation. Surface oxides are removed from the strip as it passes through a sulfuric acid cleaning tank. After acid cleaning, the strip is rinsed in a rinse tank to remove the acid solution prior to entering the electrolytic tin plating tank. In the electrolytic tin plating tank, tin is electrolytically plated on both sides of the strip. Excess tin plating solution is removed in the tin plating rinse tank. The strip is dried and processed through a melter quench to reduce the temperature of the strip prior to further processing in the chemical treatment tank. The chromium is applied to the strip in the chemical treatment tank to enhance rust resistiveness and adhesion of organic coatings. After the protective coating is applied, the strip is dried and processed through an electrostatic oiler where a coating oil is applied to reduce abrasion damage. The strip is then coiled prior to storage for direct sales.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Electrolytic Tinning at Tin Division

**Process Start Up Date:** 1965

**Process Throughput Rates:**

<b>Capacity:</b>	0.33 million tons/year
<b>1993 Throughput Rate:</b>	0.30 million tons

**Water Discharges To Outfalls:** None

TM-15 and TM-16 Concluded

***Revert/Recycled Materials:***

<b><u>Source</u></b>	<b><u>Type of Material</u></b>	<b><u>Generation Rate</u></b>
Shear and Scrap Baller	Scrap Steel	Not Available
Electrolytic Tin Plating Tank	Tin Anodes	600 tons/year
Sludge Pit	Tin Dross	50 tons/year

***Waste Streams:***    None

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**FACT SHEET**

**Reference Figure No.:** TM-17

**Process Identification:** Tin Mill Recoil and Inspection Line

**Process Description:** Steel coils received from the Electrolytic Tinning Lines are uncoiled and processed through a shear and inspection stations. The shear cuts the steel strip to the desired length. At the inspection station, the steel strip is examined for defects and the defects marked, if found. Steel strips that pass the inspection stations are coiled for direct sales

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** East of Electrolytic Tinning at Tin Division

**Process Start Up Date:** 1967

**Process Throughput Rates:**

**Capacity:** 0.13 million tons/year  
**1993 Throughput Rate:** 0.09 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Shear	Scrap Steel	Not Available

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** CTP-1

**Process Identification:** Chrome Treatment Plant

**Process Description:** Certain chromium bearing process water streams from No. 1 Tin Free Steel Line, Nos. 5 and 6 Electrolytic Tinning Lines, and Nos. 6 and 8 Galvanizing Lines enter the Chrome Treatment/Chrome Reduction Plant through the flash mix tank. Sulfuric acid and sodium bisulfite are added in the equalization tank and the two reduction tanks to reduce the chromium from hexavalent to trivalent. At the Terminal Treatment Plant, lime and caustic soda are added for pH adjustment and a polymer is introduced to aid in flocculation. Sludge from the No.1 API Separator is dewatered in a filter a press. Process water from the API Separator is sent to the Final Oil Separator before discharge to the Grand Calumet River.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Terminal Treatment Plant

**Process Start Up Date:** September 1992

**Process Throughput Rates:**

**Capacity:** 576,000 GPD  
**1993 Throughput Rate:** 278,200 GPD

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Final Oil Separator	Treated Water	30 MGD (0.3 MGD from Chrome Treatment)

**Revert/Recycled  
Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Final Oil Separator	Skimmed Oil	Variable

CTP-1 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Filter Press	Chrome Sludge Filter Cake	Hazardous (Based on Chemical Analysis for Chromium)	1,655 tons (1993)

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**FACT SHEET**

**Reference Figure No.:** SM-1 and SM-2

**Process Identification:** Slab Conditioning (North, Center and South Yards)

**Process Description:** The Slab Conditioning area receives steel slabs and ingots from the Nos. 1 and 2 Casters. At the conditioning area, surface imperfections are removed from the slabs and overlength slabs are cut to proper length for further processing at the 160/210-Inch Plate Mill. Slabs may be processed through slow cool furnaces. The cutting line cuts the overlength slabs to proper length prior to removal of surface imperfections at the deburr machine, scarfers, bug burners, hand torches, or slab grinder. Ingots received from the Nos. 1 and 2 Casters are processed through a grinder or ingot burning machine to remove surface imperfections prior to further processing at the 160/210-Inch Plate Mill.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** North, Center and South Yards in 46" Slabbing Mill

**Process Start Up Date:** January 1992

**Process Throughput Rates:**

**Capacity:** 1.0 million tons  
**1993 Throughput Rate:** 0.9 million tons

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Cutting Line Collection Pit	Scale	90 tons/month
Cutting Line Collection Pit	Scrap Steel	10 tons/month
Deburr Collection Pit	Scale	5 tons/month
Baghouse	Dust	3 tons/month

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** TTP-1

**Process Identification:** Terminal Treatment Plant

**Process Description:** Process water from the Sheet Mills, Tin Plate Mills, Pickling Lines, Galvanizing Lines and 84" Hot Strip Mill are treated at the Terminal Treatment Plant to meet the effluent limitations in the Gary Works NPDES permit prior to discharge to surface waters. The treatment starts at the primary mixers where lime or Spent Pickle Liquor (SPL) is added to the incoming process water for pH control and/or as a flocculator agent. Oil is removed in the API Separators and decanted prior to recycling at an on-site recycling facility. Process water enters the secondary mixers where additional ferrous chloride and lime are added. The mixture then enters the flocculator clarifiers where solids and metals are removed. The underflow (solids) from the clarifiers are sent to drying beds for drying prior to disposal. The overflow (water) is sent to the final oil separator before discharge to the Grand Calumet River. Sludge from the Final Oil Separator is dried in drying beds. Oil from the Final Oil Separator is sent to an on-site oil recycler.

Water from the No. 1 Electro galvanize Line is mixed with lime in a primary mixing tank prior to entering an API Separator. Solids from the separator are dewatered and sent to an off-site recycler. The water from the separator is sent to the secondary mixing tanks for further treatment prior to discharge.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Terminal Treatment Plant

**Process Start Up Date:** 1967

**Process Throughput Rates:**

**Capacity:** 21.6 MGD  
**1993 Throughput Rate:** 19.2 MGD

**Water Discharges:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Final Oil Separator	Process and Non-Contact Cooling	30 MGD

TTP-1 Concluded

***Revert/Recycled Materials:***

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Oil Handling Tank and Oil Storage Tank	Used Oil	Variable
Filter Press	No. 1 EGL Sludge	6,300 tons (1993)

***Waste Streams:***

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Sludge Drying Beds	Sludge	Non-Hazardous (Based on Chemical Analysis)	71,400 tons (1993)

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**FACT SHEET**

**Reference Figure No.:** HSM-1 and HSM-2

**Process Identification:** 84-Inch Hot Strip Mill and Process Water Recycle System

**Process Description:** The Hot Strip Mill produces hot rolled steel strip coils for further processing through the Plate Mill, Pickle Lines, Sheet Mills, Tin Mills or direct sales. Steel slabs received from Steel Producing Casters are heated to rolling temperature in the reheat furnaces to enable reduction from slab to steel strip thickness. Slabs are processed through scale breakers and high pressure water sprays to remove surface oxides present on the slab. Water and scale are discharged to a flume and scale pit for oil, water and scale separation through settling. The slabs are then processed through a series of roughing mill stands for initial size (slab thickness) reduction. The steel slabs are processed further through the finishing mill stands for final size reduction to steel strip and are cooled with water on the runout table prior to coiling. The steel coils are transported by conveyor or truck to downstream processing facilities or to off-site customers.

The 84-Inch Hot Strip Mill Recycle System receives, treats and recycles process water from the 84-Inch Hot Strip Mill. Process water from the Hot Strip Mill Roughing Mill and Finishing Mill Scale Pits is pumped to multi-media filters and gravity discharges to a process water hotwell. The process water is pumped to a cooling tower and the cooled water is recycled back to the Roughing Mills and Finishing Mills for scale removal and cooling. The Runout Table water is used to cool the steel strip prior to coiling and contains minimal scale and/or used lubricants. Therefore, Runout Table water is not processed through the gravity filter system and is pumped directly to the cooling tower and recycled back to the Runout Table. As required, the multi-media filters are backwashed for cleaning and the backwash water and sludge are discharged to thickeners for sludge concentration and removal.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** 84-Inch Hot Strip Mill Building Cooling Tower and Filtration Plant

**Process Start Up Date:** June 1967 - Hot Strip Mill and Filtration Plant  
1983 - Recycle System

**Process Throughput Rates:**

Hot Strip Mill	<b>Capacity:</b>	6.0 million tons/year
	<b>1993 Throughput Rate:</b>	5.4 million tons
Recycle System	<b>Capacity:</b>	170 million gallons/day
	<b>1993 Throughput Rate:</b>	170 million gallons/day

## HSM-1 and HSM-2 Concluded

### ***Water Discharges To Outfalls:***

<u><b>Source</b></u>	<u><b>Type of Water</b></u>	<u><b>Nominal Discharge Rate</b></u>
Motor Room	Non-contact Cooling	10 MGD
Miscellaneous Heat Exchangers	Non-contact Cooling	(Included Above)
Blowdown Station	Process	3 MGD

### ***Revert/Recycled Materials:***

<u><b>Source</b></u>	<u><b>Type of Material</b></u>	<u><b>Generation Rate</b></u>
Various	Used Oil and Grease	275,000 gallons/year
Roughing Mill Scale Pit	Mill Scale	65,000 tons/year
Various	Steel Scrap	Not Available

### ***Waste Streams:***

<u><b>Source</b></u>	<u><b>Type of Waste</b></u>	<u><b>Characterization</b></u>	<u><b>Generation Rate</b></u>
Reheat Furnaces	Waste Refractories	Non-hazardous (Based on Process Knowledge)	Variable
Finishing Mill Scale Pit	Sludge	Non-hazardous (Based on Chemical Analysis)	1,700 tons/year
Filtration Plant Thickeners	Sludge	Non-Hazardous (Based on Chemical Analysis)	25,000 tons/year

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**EXAMPLE FACT SHEET**

Reference Figure No.      HSM-1

Process Identification:    84-Inch Hot Strip Mill

Process Description:      The Hot Strip Mill produces hot rolled steel strip coils for further processing through the Plate Mill, Pickle Lines, Sheet Mills, Tin Mills or direct sales. Steel slabs received from Steel Producing Casters are heated to red hot in the reheat furnaces to enable steel reduction from slab to steel strip thickness. Slabs are processed through scale breakers and high pressure water sprays to remove surface oxides present on the slab. Water and scale are discharged to a flume and scale pit for oil, water and scale separation through settling. The slabs are then processed through a series of roughing mill stands for initial size (slab thickness) reduction. The steel slabs are processed further through the finishing mill stands for final size reduction to steel strip and are cooled with water on the runout table prior to generation of steel strip coils. The steel coils are transported by conveyor or truck to designated further processing facilities.

Process Location (Referenced to plant map building in which process is located or directions from nearest buildings)      84-Inch Hot Strip Mill

Process Start Up Date:      June 1967

Process Throughput Rates:

Capacity	6.0 million tons
1993 Throughput Rate	5.4 million tons

Water Discharges:

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Reheat Furnaces	Non-contact Cooling Water	45 MGD
Motor Room Cooling and Miscellaneous Heat Exchangers	Non-contact Cooling Water	10 MGD

*Can't Find*

Roughing Mill, Finishing  
Mill and Runout Table  
Scale Pits

Process Water

No direct outfall  
discharge; process water  
part of closed loop Hot  
Strip Mill Recycle System

Waste Streams:

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Reheat Furnaces	Refractory Materials	Non-hazardous	350 cubic yards per year
Roughing Mill Scale Pit	Oily Mill Scale	Non-hazardous	1,200 cubic yards per year
Finishing Mill Scale Pit	Scale Pit Sludge	Non-hazardous	1,500 cubic yards per year
Roughing Mill and Finishing Mill Scale Pits	Used Oil	Non-hazardous	275,000 gallons per year (recycled on-site through Oil Technology)
Roughing Mill Scale Pit	Mill Scale	Non-hazardous	28,300 cubic yards per year (recycled on-site through Sinter Plant)

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**EXAMPLE FACT SHEET**

Reference Figure No.      HSM-2

Process Identification:    84-Inch Hot Strip Mill Recycle System

Process Description:      The 84-Inch Hot Strip Mill Recycle System is a closed loop system that receives, treats and recycles process water from the 84-Inch Hot Strip Mill. Process water from the Hot Strip Mill Roughing Mill and Finishing Mill Scale Pits is pumped to multi-media filters and gravity discharges to a process water hotwell. The process water is pumped to a cooling tower and the cooled water is recycled back to the Roughing Mills and Finishing Mills for scale removal and slab cooling. The Runout Table water is used to quench or cool the steel strip prior to coiling and contains minimal scale and/or used lubricants. Therefore, Runout Table water is not processed through the gravity filter system and is pumped directly to the cooling tower and recycled back to the Runout Table. As required, the multi-media filters are backwashed for cleaning and the backwash water and sludge are discharged to thickeners for sludge concentration and removal.

Process Location (Referenced to plant map building in which process is located or directions from nearest buildings)      84-Inch Hot Strip Mill Cooling Tower and Filtration Plant

Process Start Up Date:              Filtration Plant - June 1967

Process Throughput Rates:	Capacity	170 Million gallons per day
	1993 Throughput Rate	170 Million gallons per day

**Water Discharges:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Blowdown Water	Filtered Process Water	3 MGD

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Filtration Plant	Filter Backwash Sludge	Non-hazardous	24,000 cubic yards per year

*Can't find*

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**FACT SHEET**

**Reference Figure No.:** NSM-1

**Process Identification:** North Sheet Mill -- 5 Stand Cold Reduction

**Process Description:** Steel strip coils from the Pickle Lines are processed through a 5-Stand Cold Reduction Mill. The thickness of steel strip is mechanically reduced by processing the steel through five roll stands.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** The 5 Stand Cold Reduction process is located in the Cold Roll Finishing building adjacent to the No. 20 Warehouse and North Annealing in the North Sheet Mill area.

**Process Start Up Date:** May 1964

**Process Throughput Rates:**

<b>Capacity:</b>	2.56 Million tons/year
<b>1993 Throughput Rate:</b>	2.36 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Lubrication and Hydraulic Systems	Non-contact Cooling Water	2 MGD
"N" Pump Station Emergency Overflow	Process Water	Emergency Discharge Only

**Revert/Recycle Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Gravity Oil/Water Separator	Used Oil	Not Available
Payoff Mandrel, Delivery Tension Reel, Shears	Scrap Steel	11,880 tons (1993)

NSM-1 Concluded

***Waste Streams:***

<u><b>Source</b></u>	<u><b>Type of Waste</b></u>	<u><b>Characterization</b></u>	<u><b>Generation Rate</b></u>
Fan and Mist Eliminators	Sludge	Non-Hazardous (Based on Chemical Analysis)	Not Available
Gravity Oil/Water Separator	Sludge	Non-Hazardous (Based on Process Knowledge)	Not Available

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**FACT SHEET**

**Reference Figure No.:** NSM-2

**Process Identification:** North Sheet Mill -- 80 Inch Temper Mill

**Process Description:** Temper rolling of steel strip from coils is conducted by passing the strip through a Temper Mill roll stand where the steel strip is rolled to improve flatness, minimize surface imperfections, and alter the mechanical properties of the steel. The steel strip is recoiled on a delivery reel with the finished coils then coated with a rust inhibitor.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** The 80 Inch Temper Mill is located in the Cold Roll Finishing building adjacent to the No. 20 Warehouse and North Annealing in the North Sheet Mill area.

**Process Start Up Date:** January 1964

**Process Throughput Rates:**

<b>Capacity</b>	1.87 Million tons/year
<b>1993 Throughput Rate</b>	1.28 tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Recirculating Lubrication and Hydraulic Systems	Non-contact Cooling	0.1 MGD
"N" Pump Station Emergency Overflow	Process	Emergency Discharges Only

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Payoff Mandrel & Shear	Scrap Steel	43,920 tons (1993)

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** NSM-3

**Process Identification:** North Sheet Mill -- 80 Inch Recoil Line

**Process Description:** The Recoil Line is used to remove off gage material from the head and tail ends of steel strip following cold reduction processes. The line also performs the recoiling of the steel strip into coils that are then sprayed with a rust inhibitor prior to transfer of the coils to annealing or electrogalvanizing.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** The 80 Inch Recoil Line is located in the Cold Roll Finishing building adjacent to the No. 20 Warehouse and North Annealing in the North Sheet Mill area.

**Process Start Up Date:** January 1964

**Process Throughput Rates:**

<b>Capacity:</b>	0.66 Million tons/year
<b>1993 Throughput Rate:</b>	0.41 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Circulating Hydraulic Fluid System	Non-contact Cooling	Not Available
N-Pump Station Emergency Overflow	Process	Emergency Discharges Only

**Revert/Recycled Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Inspection Station & Shear	Scrap Steel	15,040 tons (1993)

**Waste Streams:** None

**U.S. STEEL GARY WORKS  
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**FACT SHEET**

**Reference Figure No.:** HRF-1

**Process Identification:** Cold Mills/Hot Rolled Finishing -- 2 Stand Temper Mill and Combo Shear Line

**Process Description:** Temper rolling of steel strip from coils is conducted by passing the strip through two Temper Mill roll stands where the steel strip is rolled to improve flatness, minimize surface imperfections, and alter the mechanical properties of the steel. The steel strip is recoiled on a delivery reel with the finished coils then coated with a rust inhibitor in the Side-Wall Oiler.

The Combo Shear Line has not been operated for three years. When operational, the line processes steel strip by removing off gage material from the head and tail ends and sides of the strip while also levelling the steel strip through rolling. Finished steel strip is recoiled on a delivery reel and also coated with a rust inhibitor prior to transfer to the warehouse for storage prior to sales.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** The 2 Stand Temper Mill is located in the Temper Rolling building adjacent to South Annealing. The Combo Shear Line is located in the Hot Rolled Finishing building on the west end of the No. 18 Warehouse and adjacent to No. 17 Warehouse to the south.

**Process Start Up Date:** 2 - Stand Temper Mill - 1974  
Combo Shear Line - 1968

**Process Throughput Rates:**

**Capacity:** 2-Stand Temper Mill - 0.78 Million tons/year  
Combo Shear Line - 0.36 Million tons/year

**1993 Throughput Rate:** 2-Stand Temper Mill - 0.62 Million tons  
Combo Shear Line - (Not operated in 1993)

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Circulating Hydraulic Fluid System	Non-contact Cooling	0.1 MGD

HRF-1 Concluded

***Revert/Recycled Materials:***

<u><i>Source</i></u>	<u><i>Type of Material</i></u>	<u><i>Generation Rate</i></u>
Payoff Mandrel/Shear	Scrap Steel	24,820 tons (1993)
Side-Wall Oiler Sump	Excess Oil	Variable

***Waste Streams:***    None

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**FACT SHEET**

**Reference Figure No.:** HRF-2

**Process Identification:** Cold Mills/Hot Rolled Finishing -- 84 Inch Temper Mill & Coil Prep Line

**Process Description:** Temper rolling of 84 Inch steel strip from coils coming from either the pickle lines or the 84 Inch Hot Strip Mill is processed through a single Temper Mill roll stand where the steel strip is rolled to improve flatness, minimize surface imperfections, and alter the mechanical properties of the steel. The steel strip is recoiled on a delivery reel with the finished coils then coated with a rust inhibitor.

The Coil Prep Line processes steel strip from coils by removing off gage material from the head and tail ends of the strip while also levelling the steel strip through rolling. Finished steel strip is recoiled on a delivery reel prior to transfer to the warehouse prior to sales.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** The 84 Inch Temper Mill and Coil Prep Line are located in the Hot Rolled Warehouse building north of the Hot Rolled Finishing building and on the west end of the No. 19 Warehouse.

**Process Start Up Date:** 84 Inch Temper Mill - 1967, Coil Prep Line - 1968

**Process Throughput Rates:**

**Capacity:** 84 Inch Temper Mill - 1.09 Million tons/year  
Coil Prep Line - 0.64 Million tons/year

**1993 Throughput Rate:** 84 Inch Temper Mill - 0.57 Million tons  
Coil Prep Line - 0.19 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Circulating Hydraulic Fluid System	Non-contact Cooling	0.1 MGD

**Revert Materials:**

<u>Source</u>	<u>Type of Material</u>	<u>Generation Rate</u>
Facility Shears	Scrap Steel	49,566 tons (1993)

**Waste Streams:** None

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**Reference Figure No.:** SGB-1

**Process Identification:** Steam Generation Boilers - Coke Plant Water Treatment and Boiler House

**Process Description:** The Coke Plant boilers generate steam for Coke Plant operations. Boiler feedwater is produced from processing plant service water through hot process softeners/reaction tanks, pressure filters, sodium zeolite softeners and deaerators. The treated water is then pumped to Nos. 1, 2 and 3 boilers (150 psig) by low pressure feedwater pumps and Nos. 4 through 8 boilers (900 psig) by high pressure feedwater pumps. The boilers may be fired by purchased fuels or by-product fuels to produce steam. High pressure steam is supplied to the steam driven turbines or reduced to low pressure steam to supply steam to coke oven gas cleaning facilities. Nos. 1 and 2 boilers have not operated in about 5 years.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** #2 Boiler House at Coke Plant

**Process Start Up Date:** 1928

**Process Generation Rates:**

**Capacity:** 9,372,000 MMBTU/year  
**1993 Generation Rate:** 3,708,800 MMBTU

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Boilers	Process	Variable
Condenser	Non-contact Cooling	3 MGD
Hot Process Softeners/Reaction Tanks Thickener	Process	Emergency Overflow Only

**Revert/Recycled Materials:** None

**Waste Streams:**

<u>Source</u>	<u>Type of Waste</u>	<u>Characterization</u>	<u>Generation Rate</u>
Filter Press	Filter Cake	Non-hazardous (Based on Process Knowledge)	Not Available

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**Reference Figure No.:** SGB-2

**Process Identification:** Steam Generation Boilers - Central Water Treatment and No. 4 Boiler House

**Process Description:** Central Water Treatment produces the boiler feedwater for the No. 4 and Turbo Blower Boiler Houses. The No. 4 Boiler House generates steam for the Turbo Generators and other heating and processing operations. Boiler feedwater is produced from processing plant service water through hot process softeners/reaction tanks, pressure filters, sodium zeolite softeners and deaerators. The treated water is pumped to the Nos. 1, 2 and 3 Boilers (265 psig) by feedwater pumps. Nos. 1, 2 and 3 Boilers may be fired by purchased fuels or by-product fuels to produce steam.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Central Water Treat and No. 4 Boiler House

**Process Start Up Date:** Central Water Treatment - 1955  
Nos. 1, 2 and 3 Boilers - 1969

**Process Generation Rates:**

<b>Capacity:</b>	13,028,000 MMBTU/year
<b>1993 Generation Rate:</b>	7,198,000 MMBTU

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Steam Condensate	Process	Variable
Boilers	Blowdown	Variable

**Revert/Recycled Materials:** None

**Waste Streams:** None

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**Reference Figure No.:** SGB-3

**Process Identification:** Steam Generation Boilers - Turbo Blower Boiler House

**Process Description:** The Turbo Blower Boiler House generates steam for the Turbine Blowers for the blast furnaces, No. 4 Boiler House Boilers, Sheet and Tin Mills and other east end side facilities. Treated water from Central Water Treatment is pumped to deaerators and to the boilers (675 psig) by feedwater pumps. Nos. 1, 2, 3, 5 and 6 Boilers may be fired by by-product fuels or purchased fuels to produce steam. No. 4A Boiler can only be fired by natural gas.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Turbo Blower Boiler House

**Process Start Up Date:** Nos. 1, 2 and 3 Boilers - 1948  
No. 4A Boiler - 1990  
No. 5 Boiler - 1958  
No. 6 Boiler - 1972

**Process Generation Rates:**

**Capacity:** 22,715,000 MMBTU/year  
**1993 Generation Rate:** 11,879,000 MMBTU

**Water Discharges To Outfalls:** None

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Turbo Blower Boiler House	Condenser Non-contact Cooling and Boiler Blowdown	20 MGD
Turbo Blower Boiler House	Non-contact Cooling	5 MGD

**Revert/Recycled Materials:** None

**Waste Streams:** None

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**Reference Figure No.:** SGB-4

**Process Identification:** Steam Generation Boilers - 84-Inch Waste Heat Boilers

**Process Description:** The 84-Inch Waste Heat boilers generate steam for 84-Inch Hot Strip Mill and other west end facilities. Boiler feedwater is produced from processing plant service water through strainers, pressure filters, mixed bed softeners, decarbonators and a deaerator. The treated water is pumped to the boilers (150 psig) by feedwater pumps. The boilers may be fired by waste heat from the 84-inch Hot Strip Mill reheat furnaces, coke oven gas or natural gas to produce steam.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Inside 84-Inch Hot Strip Mill Building

**Process Start Up Date:** 1968

**Process Generation Rates:**

<b>Capacity:</b>	3,084,000 MMBTU/year
<b>1993 Generation Rate:</b>	1,331,000 MMBTU

**Water Discharges To Outfalls:** None

**Revert/Recycled Materials:** None

**Waste Streams:** None

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**Reference Figure No.:** SGB-5

**Process Identification:** Steam Generation Boilers - EGL Boiler House

**Process Description:** The EGL boiler generates steam for Electro-Galvanizing operations. Boiler feedwater is produced from processing plant service water through pressure filters, sodium zeolite softeners, and a deaerator. The treated water is pumped to the natural gas fired boiler (90 psig) by feedwater pumps.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Utility Bldg., North of EGL

**Process Start Up Date:** 1968

**Process Generation Rates:**

<b>Capacity:</b>	390,000 MMBTU/year
<b>1993 Generation Rate</b>	108,000 MMBTU

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Pressure Filters	Backwash	90 GPM
Sodium Zeolite Softeners	Backwash	70 GPM
Boiler	Blowdown	4 GPM

**Revert/Recycled Materials:** None

**Waste Streams:** None

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**FACT SHEET**

**Reference Figure No.:** BA-1

**Process Identification:** Cold Mills -- Batch Anneal & Box Anneal

**Process Description:** Groups (batches) of cold-rolled steel coils are heated and cooled under carefully controlled conditions in furnaces to reduce internal stresses built up in the steel during cold reduction processes. This heating and cooling process (annealing) improves the formability of the steel and reduces brittleness. Both the batch and box annealing processes are similar in operation, with the primary difference between the two processes being the physical construction of the annealing furnaces.

**Process Location (Referenced to plant map building in which process is located or directions from nearest buildings):** Box (north) Anneal is located in the northernmost building of the North Sheet Mill area adjacent to the 5 Stand Cold Reduction Mill. Batch (south) Anneal is located in the southern portion of the Sheet Products Division area south of the Temper Rolling building and east of the South Continuous Pickle (80 inch) Line.

**Process Start Up Date:** Box Anneal - May 1964, Batch Anneal - 1943

**Process Throughput Rates:**

**Capacity:**

Box Anneal - 1.2 Million tons/year  
Batch Anneal - 0.89 Million tons/yr.

**1993 Throughput Rate:**

Box Anneal - 1.14 Million tons  
Batch Anneal - 0.69 Million tons

**Water Discharges To Outfalls:**

<u>Source</u>	<u>Type of Water</u>	<u>Nominal Discharge Rate</u>
Box Annealing Furnace Cooling Water	Non-contact Cooling	3.1 MGD
Batch Annealing Furnace Cooling Water	Non-contact Cooling	0.1 MGD

**Revert/Recycled Materials:** None

BA-1 Concluded

***Waste Streams:***

<b><u>Source</u></b>	<b><u>Type of Waste</u></b>	<b><u>Characterization</u></b>	<b><u>Generation Rate</u></b>
Box Annealing	Used Ceramic Blankets	Non-hazardous (Based on Process Knowledge)	Not Available
Batch Annealing	Used Ceramic Blankets & Sand	Non-hazardous (Based on Process Knowledge)	Not Available